unlubricated condition against a steel counterface that is less than a virgin coefficient of friction of said surface in the absence of said gradient.

208. (New) The chromium coating of claim 207 wherein said gradient further comprises chromium carbide molecules.

209. (New) A chromium alloy substrate comprising a gradient from inside to an outside surface consisting essentially of:

chromium alloy molecules/a mixture comprising chromium alloy molecules and chromium oxide molecules/a surface comprising a sufficient quantity of said chromium oxide molecules to produce a final coefficient of friction in an unlubricated condition against a steel counterface that is less than a virgin coefficient of friction of said surface in the absence of said gradient.

210. (New) The chromium alloy substrate of claim 209 wherein said gradient further comprises chromium carbide molecules.

211. (New) A method of forming a lubricious chromium coating comprising:

providing a surface comprising chromium having an initial coefficient of friction in an unlubricated condition against a steel counterface; and

means for reducing said initial coefficient of friction.

212. (New) The method of claim 174 wherein said chromium coating comprises in initial hardness, and said means for reducing said initial coefficient of friction further comprises means for increasing said initial hardness.

213. (New) A chromium coating comprising

a surface comprising chromium oxide having an initial coefficient of friction in an unlubricated condition against a steel counterface; and

means for reducing said initial coefficient of friction.

214. (New) The chromium coating of claim 208 further comprising an initial hardness, said means for reducing said initial coefficient of friction further comprising means for increasing said initial hardness.

215. (New) A chromium alloy substrate comprising

a surface comprising chromium oxide having an initial coefficient of friction in an unlubricated condition against a steel counterface; and

means for reducing said initial coefficient of friction.

216. (New) The chromium alloy substrate of claim 210 further comprising an initial hardness, said means for reducing said initial coefficient of friction further comprising means for increasing said initial hardness.

217. (New) A method of forming a hard chromium coating comprising:

providing a chromium coating having an initial hardness; and

means for increasing said initial hardness.

218. (New) The method of claim 212 wherein said means for reducing said initial hardness further comprises means for decreasing said initial coefficient of friction.

219. (New) A chromium coating comprising

a surface comprising chromium oxide having an initial hardness; and

means for increasing said initial hardness.

220. (New) The chromium coating of claim 219 wherein said means for reducing said initial hardness further comprises means for decreasing said initial coefficient of friction.

221. (New) A substrate comprising a chromium coating comprising:

a gradient consisting essentially of primarily chromium/a mixture of chromium-X molecules and chromium molecules/a surface comprising a sufficient quantity of said chromium-X molecules to produce a final coefficient of friction in an unlubricated condition against a steel counterface that is less than a virgin coefficient of friction of said surface in the absence of said gradient;

X being selected from the group consisting of fluorine, oxygen, sulfur, and chlorine.

222. (New) The substrate of claim 221 wherein X is fluorine.

223. (New) The substrate of claim 221 wherein X is sulfur.

224. (New) A substrate comprising a chromium coating comprising a gradient from inside to an outside surface consisting essentially of:

primarily chromium molecules/a mixture of chromium oxide molecules and chromium molecules/a surface comprising a sufficient quantity of said chromium oxide molecules to produce a final coefficient of friction in an unlubricated condition against a steel counterface that is less than a virgin coefficient of friction of said surface in the absence of said gradient.

225. (New) The substrate of claim 224 wherein said gradient further comprises chromium carbide molecules.

226. (New) The substrate of claim 224 comprising an automotive component.

227. (New) The substrate of claim 224 comprising an aeronautical component.

228. (New) The substrate of claim 224 comprising a journal bearing.

229. (New) The substrate of claim 224 comprising a tool for injection molding of filled polymers.

230. (New) The substrate of claim 224 wherein said tool is selected from the group consisting of a plated mold and a runner block.

231. (New) A medical implant comprising a gradient from inside to an outside surface consisting essentially of:

chromium alloy molecules/a mixture comprising chromium alloy molecules and chromium oxide molecules/a surface comprising a sufficient quantity of said chromium oxide molecules to produce a final coefficient of friction in an unlubricated condition against a steel counterface that is less than a virgin coefficient of friction of said surface in the absence of said gradient.

232. (New) The medical implant of claim 231 wherein said gradient further comprises chromium carbide molecules.

233. (New) The medical implant of claim 231 comprising a total joint replacement.

234. (New) The medical implant of claim 232 comprising a total joint replacement.

235. (New) A medical implant comprising a gradient from inside to an outside surface consisting essentially of:

a surface comprising chromium oxide having an initial coefficient of friction in an unlubricated condition against a steel counterface; and

means for reducing said initial coefficient of friction.

236. (New) The medical implant of claim 169 further comprising means for increasing an initial hardness of said surface.

237. (New) The medical implant of claim 234 comprising a total joint replacement.

238. (New) The medical implant of claim 235 comprising a total joint replacement.

Respectfully submitted,

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